

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. to 4. (Cancelled).

5. (Currently Amended) A spent liquor recovery boiler system comprising:
a boiler further comprising a water or steam circulation system having superheaters and a furnace for recovering energy and chemicals from spent liquor combusted in the furnace;
walls of the boiler further comprising a plurality of water cooled tubes in fluid communication with the water or steam circulation system;
at least one cavity separate from the boiler, said cavity having cavity walls formed of water cooled tubes in fluid communication with the water cooled tubes in at least one of the walls of the boiler and the superheaters of the water or steam circulation system of the boiler, wherein at least a portion of the water cooled tubes of the cavity walls is formed of the water cooled tubes of the at least one of the wallsa front wall of the boiler;
a fuel combustor arranged in the at least one cavity;
at least one outlet of the cavity for discharging combustion gases from the cavity to the boiler at an elevation below the superheaters of the boiler, wherein said outlet of the cavity is opposite a bullnose section of a rear wall of the boiler and the outlet discharges combustion gases from the at least one cavity immediately upstream of the superheaters of the boiler, and

an interior of the at least one cavity having a cavity heat exchanger for superheating steam generated by superheaters in the boiler, wherein the cavity heat exchanger is below the fuel combustor and above the at least one outlet of the cavity and the cavity heat exchanger receives steam from at least one of the superheaters in the boiler.

6. to 9 (Cancelled)

10. (Currently Amended) A liquor recovery boiler system comprising:

a boiler further comprising at least one wall defining a furnace, at least one liquor injector arranged to inject liquor into the furnace, and at least one superheater arranged in a flue gas passage for combustion gases generated in the furnace,

a plurality of water cooled tubes arranged in the at least one wall defining the furnace;

at least one cavity separate from the furnace and having walls formed of water cooled tubes, wherein fluid flowing through at least one of the water cooled tubes of the at [[lest]]least one wall defining the furnace flows through at least one of the water cooled tubes of the cavity and flows to the at least one superheater, and wherein at least a portion of the at least one of the water cooled tubes of the cavity are formed of at least one of the water cooled tubes of the walls of the boiler such that water or steam flows from the at least one of the water cooled tubes of the walls of the boiler to the at least one of the water cooled tubes of the cavity and to the at least one superheater in the flue gas passage in the furnace;

a fuel combustor arranged in the at least one cavity;

at least one outlet for discharging combustion gases from the cavity to the boiler;

an interior of the at least one cavity being provided with a heat exchanger which

receives superheated steam from the at least one superheater of the boiler, wherein the
heat exchanger (i) is below the fuel combustor of the at least one cavity and above the at
least one outlet, and (ii) receives steam from the at least one superheater in the flue gas
passage of the boiler, and

a gasifier for gasifying a biomass material and said gasifier produces combustion
gas provided to the fuel combustor of the cavity.

11. (Previously Presented) The liquor recovery boiler system of claim 10 wherein
the liquor injector discharges spent liquor into the furnace.

12. (Currently Amended) The liquor recovery boiler system of claim 10 wherein
the at least one superheater of the boiler is a plurality of superheaters arranged in a flue
gas stream of the boiler.

13. (Cancelled)

14. (Previously Presented) The liquor recovery boiler system according to claim
10 wherein the at least one cavity is located on a front wall of the boiler.

15. (Previously Presented) The liquor recovery boiler system according to claim
10 wherein the at least one outlet for combustion gases is connected to the boiler and
provides a conduit for combustion gases from the at least one cavity to be discharged
immediately upstream of the superheaters of the boiler.

16. (Previously Presented) The liquor recovery boiler system according to claim 10 wherein the outlet of the cavity is in a front wall of the boiler and said outlet is opposite to a bullnose section of a rear wall of the boiler.

17. (Cancelled)

18. (Previously Presented) The liquor recovery boiler system according to claim 10 wherein the cavity is adjacent an outside surface of the at least one wall of the furnace.

19. (Currently Amended) A method for superheating steam in a recovery boiler having at least one wall defining a furnace and a separate combustion cavity, said method comprising:

a. injecting spent liquor in the furnace to generate hot combustion flue gases in the furnace;

b. cooling the at least one wall of the furnace by flowing cooling fluid through the wall;

c. generating hot combustion gases in the cavity, wherein the combustion gases in the cavity are generated in a gasifier gasifying a biomass material and the combustion gases are generated in an upper portion of the cavity;

d. cooling a cavity wall of the cavity by flowing the cooling fluid from the at least one wall of the furnace through the cavity wall, wherein the cavity wall is at least partially formed of the at least one wall of the furnace;[[, and]]

e. passing cooling fluid from the wall of the cavity to a superheater arranged in a flue gas passage of the boiler;

f. passing cooling fluid from the superheater in the gas passage of the boiler directly to a superheater in the cavity, wherein the superheater in the cavity is below the upper portion of the cavity and above a combustion gas outlet between the cavity and the at least one wall of the furnace;

g. passing the combustion gases in the cavity downward from the gasifier, over the superheater in the cavity and to the outlet to mix the combustion gases with the flue gases in the furnace.

20. (Currently Amended) The method of claim 19 wherein the hot combustion gases in the cavity are discharged into the boiler upstream of the superheater in the boiler.

21. (Cancelled)

22. (Currently Amended) The method of claim 19 wherein the cooling fluid flows vertically upward through the at least one wall of the furnace and then to the cavity.

23. (Currently Amended) The method of claim 19 wherein the cooling fluid in the superheater of the boiler is heated to a temperature no greater than 520⁰C.

24. (Currently Amended) The method of claim 19 further comprising passing fluid from the superheater in the gas passage of the boiler to a heat exchanger the superheater in the cavity, and wherein the fluid in the superheater in the boiler is heated to a temperature no greater than 520⁰C and the fluid in the heat exchanger superheater in the cavity is heated to a temperature in a range of 500⁰C to 600⁰C.

25. (Currently Amended) The method of claim 19 further comprising passing fluid from the superheater in the gas passage of the boiler to a heat exchanger superheater

in the cavity, and wherein the fluid in the superheater in the boiler is heated to a temperature in a range of 480⁰C to 520⁰C and the fluid in the ~~heat exchanger~~^{superheater} in the cavity is heated to a temperature in a range of 500⁰C to 600⁰C.

26. (Cancelled)

27. (Currently Amended) The method of claim [[26]]¹⁹ wherein the biomass material is selected from a group consisting of oil, methanol and liquefied biomass.

28. (Currently Amended) A method for superheating steam in a recovery boiler having at least one wall defining a furnace and a separate combustion cavity, wherein said furnace and separate combustion cavity include walls formed of common water cooled tubes in fluid communication, said method comprising:

- a. injecting spent liquor in the furnace to generate hot combustion flue gases in the boiler;
- b. directing the flue gases through a flue gas passage of the furnace;
- c. generating hot combustion gases in an upper region of the cavity;
- d. flowing cooling fluid through the common water cooled tubes from the wall of the furnace to the wall of the cavity;
- e. injecting the hot combustion gases from the cavity into the furnace at an opening [[in]]~~between the cavity and a front wall of the furnace proximate to a narrow portion of the flue gas passage, wherein the narrow portion is more narrow than an upstream portion of the furnace where the hot combustion flue gases are generated and opposite to a bullnose section of a back wall of the furnace~~^{[[, and]]}

[[e.]]~~f~~ the injection of the hot combustion gases from the cavity mixes, in the narrow portion, with the flue gas in the flue gas passage, as the flue gas flows past the narrow portion

g. ~~flowing the cooling fluid from the water cooled tubes of the cavity to a superheater in a portion of the flue gas passage of the furnace downstream of the mixing of the hot combustion gases from the cavity and the flue gases in the flue gas passage, and~~

g. ~~directing the cooling fluid from the superheater in the flue gas passage to a superheater in the cavity between the upper region of the cavity and the opening between the cavity and the furnace, wherein the steam is directed through a conduit external to the flue gas passage.~~

29 to 38. (Cancelled)